Complete Summary

GUIDELINE TITLE

(1) Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines 2006. (2) Update to CDC's sexually transmitted diseases treatment guidelines, 2006: fluoroquinolones no longer recommended for treatment of gonococcal infections.

BIBLIOGRAPHIC SOURCE(S)

Centers for Disease Control and Prevention (CDC). Update to CDC's sexually transmitted diseases treatment guidelines, 2006: fluoroquinolones no longer recommended for treatment of gonococcal infections. MMWR Morb Mortal Wkly Rep 2007 Apr 13;56(14):332-6. [10 references] PubMed

Centers for Disease Control and Prevention, Workowski KA, Berman SM. Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines 2006 [published errata appear in MMWR Morb Mortal Wkly Rep 2006 Sep 15;55(36):997]. MMWR Morb Mortal Wkly Rep 2006 Aug 4;55(RR-11):35-49. [222 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline, combined with the addendum, updates a previous version: Centers for Disease Control and Prevention. Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines. MMWR Recomm Rep 2002 May 10;51(RR-6):30-42.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- September 11, 2007, Rocephin (ceftriaxone sodium): Roche informed healthcare professionals about revisions made to the prescribing information for Rocephin to clarify the potential risk associated with concomitant use of Rocephin with calcium or calcium-containing solutions or products.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Urethritis
- Nongonococcal urethritis (NGU)
- Cervicitis
- Chlamydial infection, including genital infection, ophthalmia neonatorum, and infant pneumonia
- Gonorrhea and other gonococcal infections, including quinolone-resistant Neisseria gonorrhoeae infection; gonococcal infection of the cervix, urethra, rectum, pharynx, and conjunctiva, disseminated gonococcal infection, gonococcal meningitis and endocarditis, ophthalmia neonatorum and gonococcal scalp abscess in newborns

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Prevention
Treatment

CLINICAL SPECIALTY

Family Practice
Infectious Diseases
Internal Medicine
Obstetrics and Gynecology
Pediatrics
Preventive Medicine
Urology

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Care Providers
Managed Care Organizations
Nurses
Physician Assistants
Physicians
Public Health Departments

GUIDELINE OBJECTIVE(S)

- To update the Sexually Transmitted Diseases Treatment Guidelines 2002 (MMWR 2002;51[No. RR-6])
- To assist physicians and other health-care providers in preventing and treating sexually transmitted diseases

April 2007 Addendum

- To summarize data on fluoroquinolone-resistant Neisseria gonorrhoeae in heterosexual males and in men who have sex with men throughout the United States
- To update Center for Disease Control and Prevention's (CDC's) Sexually Transmitted Diseases Treatment Guidelines, 2006 regarding the treatment of infections caused by N. gonorrhoeae

TARGET POPULATION

- Men with urethritis
- Individuals with nongonococcal urethritis
- Women with cervicitis
- Adolescents and adults with chlamydial infection
- Infants with chlamydial infection
- Adolescents and adults with gonococcal infection
- Newborns, infants, and children with gonococcal infection
- Sex partners of individuals with any of the above infections
- Mothers of infants who have any of the above infections
- Infants of mothers who have any of the above infections

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis/Screening

Nongonococcal Urethritis

1. Gram stain of urethral secretions demonstrating $\geq$5 white blood cells per oil immersion field
2. Leukocyte esterase test on first-void urine or microscopic examination of first-void urine sediment demonstrating $\geq$10 white blood cells per high power field
3. Wet mount examination and culture of an intraurethral swab for Trichomonas vaginalis

Cervicitis

1. Culture or nucleic acid amplification test for Chlamydia trachomatis (C. trachomatis) or Neisseria gonorrhoeae (preferred)
2. Count of polymorphonuclear leukocytes on endocervical Gram stain

Chlamydial Infection

1. Annual screening of women <25 years of age
2. Annual screening of older women with risk factors (e.g., those who have a new sex partner or multiple sex partners)
3. Screening of sexually active young men in clinical settings with a high prevalence of chlamydia
4. Prenatal screening of pregnant women
5. Tissue culture and nonculture tests (e.g., direct fluorescent antibody tests, enzyme immunoassays, and nucleic acid amplification tests) for C. trachomatis

Gonococcal Infection

1. Screening of women at high risk for sexually transmitted diseases
2. Screening of pregnant women
3. Culture and antimicrobial sensitivity testing of gonococci isolates in patients with resistance to treatment and in cases of infections in newborns and children
4. Gram-stained smears of exudate, cerebrospinal fluid, or joint aspirate for disseminated gonococcal infection confirmed on culture
5. Nonculture tests for gonococci (gram-stained smears, enzyme immunoassay tests, nucleic acid hybridization, nucleic acid amplification test)

Treatment

Nongonococcal Urethritis

1. Azithromycin
2. Doxycycline
3. Erythromycin base
4. Erythromycin ethylsuccinate
5. Ofloxacin
6. Levofloxacin
7. Metronidazole or tinidazole for recurrent or persistent urethritis

Cervicitis

1. Azithromycin
2. Doxycycline

Chlamydial Infection

1. Azithromycin
2. Doxycycline

3. Erythromycin base
4. Erythromycin ethylsuccinate
5. Ofloxacin
6. Levofloxacin
7. Amoxicillin

Gonococcal Infection

1. Cephalosporins such as cefixime, ceftriaxone, ceftizoxime, and cefotaxime
2. Spectinomycin
3. Dual therapy for gonococcal and chlamydial infection (cephalosporin antibiotic plus azithromycin or doxycycline)
4. Prophylactic treatment of ophthalmia neonatorum with erythromycin ophthalmic solution or tetracycline ophthalmic solution
5. Treatment for associated disorders, including disseminated gonococcal infection, pelvic inflammatory disease, and epididymitis

Management

1. Sex partner notification and referral for examination and treatment
2. Follow-up to ensure that treatment has been effective and to detect possible reinfection, with patient instruction to abstain from sexual intercourse until treatment is completed
3. Testing for concomitant human immunodeficiency virus infection

MAJOR OUTCOMES CONSIDERED

- Microbiologic cure
- Alleviation of signs and symptoms
- Prevention of sequelae
- Prevention of transmission
- Cost of treatment
- Sensitivity and specificity of diagnostic tests
- Prevalence of fluoroquinolone-resistant Neisseria gonorrhoeae

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Subjective Review

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Beginning in 2004, the Centers for Disease Control and Prevention (CDC) personnel and professionals knowledgeable in the field of sexually transmitted diseases (STDs) systematically reviewed evidence (including published abstracts and peer-reviewed journal articles) concerning each of the major STDs, focusing on information that had become available since publication of the Sexually Transmitted Diseases Treatment Guidelines, 2002. Background papers were written and tables of evidence constructed summarizing the type of study (e.g., randomized controlled trial or case series), study population and setting, treatments or other interventions, outcome measures assessed, reported findings, and weaknesses and biases in study design and analysis. A draft document was developed on the basis of the reviews.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

In April 2005, the Centers for Disease Control and Prevention (CDC) staff members and invited consultants assembled in Atlanta, Georgia, for a 3-day meeting to present the key questions regarding sexually transmitted disease (STD) treatment that emerged from the evidence-based reviews and the information available to answer those questions. When relevant, the questions focused on four principal outcomes of STD therapy for each individual disease: 1) microbiologic cure, 2) alleviation of signs and symptoms, 3) prevention of sequelae, and 4) prevention of transmission. Cost-effectiveness and other advantages (e.g., single-dose formulations and directly observed therapy of specific regimens) also were discussed. The consultants then assessed whether the questions identified were relevant, ranked them in order of priority, and attempted to arrive at answers using the available evidence. In addition, the consultants evaluated the quality of evidence supporting the answers on the basis of the number, type, and quality of the studies.

April 2007 Addendum

This report is based on data from the Gonococcal Isolate Surveillance Project (GISP), a Centers for Disease Control and Prevention (CDC) sponsored sentinel surveillance system that has been monitoring antimicrobial susceptibilities of Neisseria gonorrhoeae in the United States since 1986.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

- Evidence is insufficient to recommend routine screening for C. trachomatis in sexually active young men, based on feasibility, efficacy, and cost-effectiveness.
- For treatment of chlamydial infections, azithromycin may be more cost-effective because it enables the provision of single-dose directly observed therapy. However, doxycycline costs less than azithromycin, and has no higher risk for adverse events. Ofloxacin is similar in efficacy to doxycycline and azithromycin, but it is more expensive to use and offers no advantage with regard to the dosage regimen.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Notes from the National Guideline Clearinghouse (NGC) and the Centers for Disease Control and Prevention (CDC):

- In April 2007, CDC released an update to these recommendations regarding the treatment of gonococcal infections. Based on data from the Gonococcal Isolate Surveillance Project (GISP), which monitors antimicrobial susceptibilities of Neisseria gonorrhoeae, CDC no longer recommends the use of fluoroquinolones for the treatment of gonococcal infections and associated conditions such as pelvic inflammatory disease. The new gonococcal infection treatment recommendations are included below under the heading "April 2007 Addendum." All other recommendations remain unchanged.
- When more than one therapeutic regimen is recommended, the sequence is alphabetized unless the choices for therapy are prioritized based on efficacy, convenience, or cost. For sexually transmitted diseases (STDs) with more than one recommended regimen, almost all regimens have similar efficacy and similar rates of intolerance or toxicity unless otherwise specified.

Management of Male Patients Who Have Urethritis

Urethritis, as characterized by urethral inflammation, can result from infectious and noninfectious conditions. Symptoms, if present, include discharge of mucopurulent or purulent material, dysuria, or urethral pruritus. Asymptomatic infections are common. Neisseria gonorrhoeae (N. gonorrhoeae) and Chlamydia trachomatis (C. trachomatis) are clinically important infectious causes of urethritis. If clinic-based diagnostic tools (e.g., Gram stain microscopy) are not available, patients should be treated for both gonorrhea and chlamydia. Further testing to determine the specific etiology is recommended because both chlamydia and gonorrhea are reportable to state health departments, and a specific diagnosis might enhance partner notification and improve compliance with treatment, especially in exposed partners. Culture, nucleic acid hybridization tests, and nucleic acid amplification tests are available for the detection of both N. gonorrhoeae and C. trachomatis. Culture and hybridization tests require urethral swab specimens, whereas amplification tests can be performed on urine specimens. Because of their higher sensitivity, amplification tests are preferred for the detection of C. trachomatis.

Etiology

Several organisms can cause infectious urethritis. The presence of Gram-negative intracellular diplococci (GNID) on urethral smear is indicative of gonorrhea infection, which is frequently accompanied by chlamydial infection. Nongonococcal urethritis (NGU) is diagnosed when microscopy indicates inflammation without GNID. C. trachomatis is a frequent cause of NGU (i.e., 15%-55% of cases); however, the prevalence varies by age group, with lower prevalence among older men. The proportion of NGU cases caused by chlamydia has been declining gradually. Complications of NGU among men infected with C. trachomatis include epididymitis, prostatitis, and Reiter's syndrome. Documentation of chlamydia infection is important because of the need for partner referral for evaluation and treatment.

The etiology of the majority of cases of nonchlamydial NGU is unknown. Ureaplasma urealyticum (U. urealyticum) and Mycoplasma genitalium (M. genitalium) have been implicated as etiologic agents of NGU in some studies; however, detection of these organisms is frequently difficult. Trichomonas vaginalis (T. vaginalis), herpes simplex virus (HSV), and adenovirus might also cause NGU. Diagnostic and treatment procedures for these organisms are reserved for situations in which these infections are suspected (e.g., contact with trichomoniasis and genital lesions or severe dysuria and meatitis, which might suggest genital herpes) or when NGU is not responsive to therapy. Enteric bacteria have been identified as an uncommon cause of NGU and might be associated with insertive anal sex.

Confirmed Urethritis

Clinicians should document that urethritis is present. Urethritis can be documented on the basis of any of the following signs or laboratory tests:

- Mucopurulent or purulent discharge.

- Gram stain of urethral secretions demonstrating ≥5 white blood cells (WBCs) per oil immersion field. The Gram stain is the preferred rapid diagnostic test for evaluating urethritis. It is highly sensitive and specific for documenting both urethritis and the presence or absence of gonococcal infection. Gonococcal infection is established by documenting the presence of WBCs containing GNID, or
- Positive leukocyte esterase test on first-void urine or microscopic examination of first-void urine demonstrating ≥10 WBCs per high power field.

If none of these criteria is present, treatment should be deferred, and the patient should be tested for N. gonorrhoeae and C. trachomatis and followed closely if test results are negative. If the results demonstrate infection with either N. gonorrhoeae or C. trachomatis, the appropriate treatment should be given and sex partners referred for evaluation and treatment.

Empiric treatment of symptoms without documentation of urethritis is recommended only for patients at high risk for infection who are unlikely to return for a follow-up evaluation. Such patients should be treated for gonorrhea and chlamydia. Partners of patients treated empirically should be evaluated and treated.

Management of Patients Who Have Nongonococcal Urethritis

Diagnosis

All patients who have confirmed or suspected urethritis should be tested for gonorrhea and chlamydia. Testing for chlamydia is strongly recommended because of the increased utility and availability of highly sensitive and specific testing methods, and because a specific diagnosis might enhance partner notification and improve compliance with treatment, especially in the exposed partner.

Treatment

Treatment should be initiated as soon as possible after diagnosis. Azithromycin and doxycycline are highly effective for chlamydial urethritis; however, infections with M. genitalium may respond better to azithromycin. Single-dose regimens have the advantage of improved compliance and of directly observed treatment. To improve compliance, ideally the medication should be provided in the clinic or health-care provider's office.

Recommended Regimens

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

Alternative Regimens

- Erythromycin base 500 mg orally four times a day for 7 days

  OR

- Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days

  OR

- Ofloxacin 300 mg twice a day for 7 days

  OR

- Levofloxacin 500 mg once daily for 7 days

Follow-Up for Patients Who Have Urethritis

Patients should be instructed to return for evaluation if symptoms persist or recur after completion of therapy. Symptoms alone, without documentation of signs or laboratory evidence of urethral inflammation, are not a sufficient basis for retreatment. Patients should be instructed to abstain from sexual intercourse until 7 days after therapy is initiated, provided their symptoms have resolved and their sex partners have been adequately treated. Persistence of pain, discomfort, and irritative voiding symptoms beyond 3 months should alert the clinician to the possibility of chronic prostatitis/chronic pelvic pain syndrome in men. Persons whose conditions have been diagnosed as a new STD should receive testing for other STDs, including syphilis and HIV.

Partner Referral

Persons with NGU should refer for evaluation and treatment all sex partners within the preceding 60 days. Because a specific diagnosis may facilitate partner referral, testing for gonorrhea and chlamydia is encouraged.

Recurrent and Persistent Urethritis

Objective signs of urethritis should be present before initiation of antimicrobial therapy. In persons who have persistent symptoms after treatment without objective signs of urethritis, the value of extending the duration of antimicrobials has not been demonstrated. Persons who have persistent or recurrent urethritis can be re-treated with the initial regimen if they did not comply with the treatment regimen or if they were reexposed to an untreated sex partner. Otherwise, a T. vaginalis culture should be performed using an intra-urethral swab and a first-void urine specimen. Some cases of recurrent urethritis after doxycycline treatment might be caused by tetracycline-resistant U. urealyticum. Urologic examinations usually do not reveal a specific etiology. Approximately 50% of men with chronic nonbacterial prostatitis/chronic pelvic pain syndrome have evidence of urethral inflammation without any identifiable microbial pathogens. If the patient was compliant with the initial regimen and reexposure can be excluded, the following regimen is recommended.

Recommended Regimens

- Metronidazole 2 g orally in a single dose

  OR

- Tinidazole 2 g orally in a single dose

  PLUS

- Azithromycin 1 g orally in a single dose (if not used for initial episode)

Special Considerations

HIV Infection

Gonococcal urethritis, chlamydial urethritis, and nongonococcal, nonchlamydial urethritis might facilitate HIV transmission. Patients who have NGU and also are infected with HIV should receive the same treatment regimen as those who are HIV negative.

Management of Patients Who Have Cervicitis

Two major diagnostic signs characterize cervicitis: 1) a purulent or mucopurulent endocervical exudate visible in the endocervical canal or in an endocervical swab specimen (commonly referred to as "mucopurulent cervicitis" or cervicitis), and 2) sustained endocervical bleeding easily induced by gentle passage of a cotton swab through the cervical os. Either or both signs might be present. Cervicitis frequently is asymptomatic, but some women complain of an abnormal vaginal discharge and intermenstrual vaginal bleeding (e.g., after sexual intercourse). A finding of leukorrhea (>10 white blood cell count (WBC) per high power field on microscopic examination of vaginal fluid) has been associated with chlamydial and gonococcal infection of the cervix. In the absence of inflammatory vaginitis, leukorrhea might be a sensitive indicator of cervical inflammation with a high negative predictive value. Although some specialists consider an increased number of polymorphonuclear leukocytes on endocervical Gram stain as being useful in the diagnosis of cervicitis, this criterion has not been standardized. In addition, it has a low positive-predictive value for infection with C. trachomatis and N. gonorrhoeae and is not available in the majority of clinical settings. Finally, although the presence of GNID on Gram stain of endocervical fluid is specific for the diagnosis of gonococcal cervical infection, it is insensitive because it is observed in only 50% of women with this infection.

Etiology

When an etiologic organism is isolated in the setting of cervicitis, it is typically C. trachomatis or N. gonorrhoeae. Cervicitis also can accompany trichomoniasis and genital herpes (especially primary HSV type 2 [HSV-2] infection). However, in the majority of cases of cervicitis, no organism is isolated, especially in women at relatively low risk for recent acquisition of these STDs (for example, women aged >30 years). Limited data indicate that infection with M. genitalium and bacterial vaginosis (BV) as well as frequent douching might cause cervicitis. For reasons that are unclear, cervicitis can persist despite repeated courses of antimicrobial

therapy. Because the majority of persistent cases of cervicitis are not caused by relapse or reinfection with C. trachomatis or N. gonorrhoeae, other determinants (e.g., persistent abnormality of vaginal flora, douching or exposure to chemical irritants, or idiopathic inflammation in the zone of ectopy) might be involved.

Diagnosis

Because cervicitis might be a sign of upper genital tract infection (endometritis), women who seek medical treatment for a new episode of cervicitis should be assessed for signs of pelvic inflammatory disease (PID) and should be tested for C. trachomatis and for N. gonorrhoeae with the most sensitive and specific test available, nucleic acid amplification test (NAAT). Women with cervicitis also should be evaluated for the presence of BV and trichomoniasis, and these conditions should be treated, if present. Because the sensitivity of microscopy to detect T. vaginalis is relatively low (approximately 50%), symptomatic women with cervicitis and negative microscopy for trichomonads should receive further testing (i.e., culture or antigen-based detection). Although HSV-2 infection has been associated with cervicitis, the utility of specific testing (i.e., culture or serologic testing) for HSV-2 in this setting is unclear. Standardized diagnostic tests for M. genitalium are not commercially available.

NAAT for C. trachomatis and N. gonorrhoeae are preferred for the diagnostic evaluation of cervicitis and can be performed on either cervical or urine samples. A finding of >10 WBC in vaginal fluid, in the absence of trichomoniasis, might indicate endocervical inflammation caused specifically by C. trachomatis or N. gonorrhoeae.

Treatment

Several factors should affect the decision to provide presumptive therapy for cervicitis or to await the results of diagnostic tests. Treatment with antibiotics for C. trachomatis should be provided in women at increased risk for this common STD (age $\leq$25 years, new or multiple sex partners, and unprotected sex), especially if follow-up cannot be ensured and if a relatively insensitive diagnostic test (not a NAAT) is used. Concurrent therapy for N. gonorrhoeae is indicated if the prevalence of this infection is high (>5%) in the patient population (young age and facility prevalence).

Concomitant trichomoniasis or symptomatic BV should also be treated if detected. For women in whom any component of (or all) presumptive therapy is deferred, the results of sensitive tests for C. trachomatis and N. gonorrhoeae (e.g., NAAT) should determine the need for treatment subsequent to the initial evaluation.

Recommended Regimens for Presumptive Treatment*

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

* Consider concurrent treatment for gonococcal infection if prevalence of gonorrhea is high in the patient population under assessment.

Recurrent and Persistent Cervicitis

Women with persistent cervicitis should be reevaluated for possible reexposure to an STD, and their vaginal flora should be reassessed. If relapse and/or reinfection with a specific STD has been excluded, BV is not present, and sex partners have been evaluated and treated, management options for persistent cervicitis are undefined. For such women, the value of repeated or prolonged administration of antibiotic therapy for persistent symptomatic cervicitis is unknown. Women who receive such a course should return after treatment so that a determination can be made regarding whether cervicitis has resolved. In women with persistent symptoms that are clearly attributable to cervicitis, ablative therapy may be considered by a gynecologic specialist.

Follow-Up

Follow-up should be conducted as recommended for the infections for which a woman is treated. If symptoms persist, women should be instructed to return for reevaluation.

Management of Sex Partners

Management of sex partners of women treated for cervicitis should be appropriate for the identified or suspected STD. Partners should be notified and examined if chlamydia, gonorrhea, or trichomoniasis was identified or suspected in the index patient and treated for the STDs for which the index patient received treatment. To avoid re-infection, patients and their sex partners should abstain from sexual intercourse until therapy is completed (i.e., 7 days after a single-dose regimen or after completion of a 7-day regimen).

Special Considerations

HIV Infection

Patients who have cervicitis and also are infected with HIV should receive the same treatment regimen as those who are HIV negative. Treatment of cervicitis in HIV-infected women is vital because cervicitis increases cervical HIV shedding. Treatment of cervicitis in HIV-infected women reduces HIV shedding from the cervix and might reduce HIV transmission to susceptible sex partners.

Chlamydial Infections

Chlamydial Infections in Adolescents and Adults

In the United States, chlamydial genital infection is the most frequently reported infectious disease, and the prevalence is highest in persons aged ≤25 years. Several important sequelae can result from C. trachomatis infection in women; the most serious of these include PID, ectopic pregnancy, and infertility. Some

women who have uncomplicated cervical infection already have subclinical upper reproductive tract infection.

Asymptomatic infection is common among both men and women, and to detect chlamydial infections health-care providers frequently rely on screening tests. Annual screening of all sexually active women aged ≤25 years is recommended, as is screening of older women with risk factors (e.g., those who have a new sex partner or multiple sex partners). The benefits of C. trachomatis screening in women have been demonstrated in areas where screening programs have reduced both the prevalence of infection and rates of PID. Evidence is insufficient to recommend routine screening for C. trachomatis in sexually active young men, based on feasibility, efficacy, and cost-effectiveness. However, screening of sexually active young men should be considered in clinical settings with a high prevalence of chlamydia (e.g., adolescent clinics, correctional facilities, and STD clinics). An appropriate sexual risk assessment should be conducted for all persons and might indicate more frequent screening for some women or certain men.

Diagnostic Considerations

C. trachomatis urogenital infection in women can be diagnosed by testing urine or swab specimens collected from the endocervix or vagina. Diagnosis of C. trachomatis urethral infection in men can be made by testing a urethral swab or urine specimen. Rectal C. trachomatis infections in persons that engage in receptive anal intercourse can be diagnosed by testing a rectal swab specimen. Culture, direct immunofluorescence, enzyme immunoassay (EIA), nucleic acid hybridization tests, and NAATs are available for the detection of C. trachomatis on endocervical and male urethral swab specimens. NAATs are the most sensitive tests for these specimens and are U.S Food and Drug Administration (FDA)-cleared for use with urine, and some tests are cleared for use with vaginal swab specimens. The majority of tests, including NAAT and nucleic acid hybridization tests, are not FDA-cleared for use with rectal swab specimens, and chlamydia culture is not widely available for this purpose. Some non-commercial laboratories have initiated NAAT of rectal swab specimens after establishing the performance of the test to meet Clinical Laboratory Improvement Amendments (CLIA) requirements. Patients whose condition has been diagnosed as chlamydia also should be tested for other STDs.

Treatment

Treating infected patients prevents transmission to sex partners. In addition, treating pregnant women usually prevents transmission of C. trachomatis to infants during birth. Treatment of sex partners helps to prevent reinfection of the index patient and infection of other partners.

Coinfection with C. trachomatis often occurs among patients who have gonococcal infection; therefore, presumptive treatment of such patients for chlamydia is appropriate (see the section on Gonococcal Infection, Dual Therapy for Gonococcal and Chlamydial Infections, below). The following recommended treatment regimens and alternative regimens cure infection and usually relieve symptoms.

Recommended Regimens

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

Alternative Regimens

- Erythromycin base 500 mg orally four times a day for 7 days

  OR

- Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days

  OR

- Ofloxacin 300 mg orally twice a day for 7 days

  OR

- Levofloxacin 500 mg orally for 7 days

A recent meta-analysis of 12 randomized clinical trials of azithromycin versus doxycycline for the treatment of genital chlamydial infection demonstrated that the treatments were equally efficacious, with microbial cure rates of 97% and 98%, respectively. These studies were conducted primarily in populations in which follow-up was encouraged, adherence to a 7-day regimen was effective, and culture or EIA (rather than the more sensitive NAAT) was used for determining microbiological outcome. Azithromycin should always be available to treat patients for whom compliance with multiday dosing is in question.

In populations that have erratic health-care-seeking behavior, poor treatment compliance or unpredictable follow-up, azithromycin might be more cost-effective because it enables the provision of single-dose directly observed therapy. However, doxycycline costs less than azithromycin, and has no higher risk for adverse events. Erythromycin might be less efficacious than either azithromycin or doxycycline, mainly because of the frequent occurrence of gastrointestinal side effects that discourage compliance. Ofloxacin and levofloxacin are effective treatment alternatives but are more expensive and offer no advantage in the dosage regimen. Other quinolones either are not reliably effective against chlamydial infection or have not been evaluated adequately.

To maximize compliance with recommended therapies, medications for chlamydial infections should be dispensed on site, and the first dose should be directly observed. To minimize transmission, persons treated for chlamydia should be instructed to abstain from sexual intercourse for 7 days after single-dose therapy or until completion of a 7-day regimen. To minimize the risk for reinfection, patients also should be instructed to abstain from sexual intercourse until all of their sex partners are treated.

Follow-Up

Except in pregnant women, test-of-cure (repeat testing 3 to 4 weeks after completing therapy) is not recommended for persons treated with the recommended or alterative regimens, unless therapeutic compliance is in question, symptoms persist, or reinfection is suspected. Moreover, the validity of chlamydial diagnostic testing at <3 weeks after completion of therapy (to identify patients who did not respond to therapy) has not been established. False-negative results might occur because of persistent infections involving limited numbers of chlamydial organisms. In addition, NAAT conducted at <3 weeks after completion of therapy in persons who were treated successfully could yield false-positive results because of the continued presence of dead organisms.

A high prevalence of C. trachomatis infection is observed in women who were treated for chlamydial infection in the preceding several months. The majority of post-treatment infections result from reinfection, frequently occurring because the patient's sex partners were not treated or because the patient resumed sex with a new partner infected with C. trachomatis. Repeat infection confers an elevated risk of PID and other complications when compared with initial infection. Therefore, recently infected women are a major priority for repeat testing for C. trachomatis. Clinicians and health-care agencies should consider advising all women with chlamydial infection to be retested approximately 3 months after treatment. Providers also are strongly encouraged to retest all women treated for chlamydial infection whenever they seek medical care within the following 3 to 12 months, regardless of whether the patient believes that her sex partners were treated. Recognizing that retesting is distinct from a test-of-cure, as discussed in this report, is vital. Limited evidence is available on the benefit of retesting for chlamydia in men previously infected; however, some specialists suggest retesting men approximately 3 months after treatment.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation, testing, and treatment. The following recommendations on exposure intervals are based on limited evaluation. Sex partners should be evaluated, tested, and treated if they had sexual contact with the patient during the 60 days preceding onset of symptoms in the patient or diagnosis of chlamydia. The most recent sex partner should be evaluated and treated, even if the time of the last sexual contact was >60 days before symptom onset or diagnosis.

If concerns exist that sex partners will not seek evaluation and treatment, or if other management strategies are impractical or unsuccessful, then delivery of antibiotic therapy (either a prescription or medication) by heterosexual male or female patients to their partners might be an option (see the NGC summary of the CDC guideline Clinical Prevention Guidance under the section Partner Management). Limited studies to date have demonstrated a trend toward a decrease in rates of persistent or recurrent chlamydia with this approach compared with standard partner referral. Male patients must inform female partners of their infection and be given accompanying written materials about the importance of seeking evaluation for PID (especially if symptomatic). Patient-delivered partner therapy is not routinely recommended for men who have sex

with men (MSM) because of a high risk for coexisting infections, especially undiagnosed HIV infection, in their partners.

Patients should be instructed to abstain from sexual intercourse until they and their sex partners have completed treatment. Abstinence should be continued until 7 days after a single-dose regimen or after completion of a 7-day regimen. Timely treatment of sex partners is essential for decreasing the risk for reinfecting the index patient.

Special Considerations

Pregnancy

Doxycycline, ofloxacin, and levofloxacin are contraindicated in pregnant women. However, clinical experience and studies suggest that azithromycin is safe and effective. Repeat testing (preferably by NAAT) 3 weeks after completion of therapy with the following regimens is recommended for all pregnant women to ensure therapeutic cure, considering the sequelae that might occur in the mother and neonate if the infection persists. The frequent gastrointestinal side effects associated with erythromycin might discourage patient compliance with the alternative regimens.

Recommended Regimens

- Azithromycin 1 g orally in a single dose

  OR

- Amoxicillin 500 mg orally three times a day for 7 days

Alternative Regimens

- Erythromycin base 500 mg orally four times a day for 7 days

  OR

- Erythromycin base 250 mg orally four times a day for 14 days

  OR

- Erythromycin ethylsuccinate 800 mg orally four times a day for 7 days

  OR

- Erythromycin ethylsuccinate 400 mg orally four times a day for 14 days

Erythromycin estolate is contraindicated during pregnancy because of drug-related hepatotoxicity. The lower dose 14-day erythromycin regimens may be considered if gastrointestinal tolerance is a concern.

HIV Infection

Patients who have chlamydial infection and also are infected with HIV should receive the same treatment regimen as those who are HIV negative.

Chlamydial Infections Among Infants

Prenatal screening of pregnant women can prevent chlamydial infection among neonates. Pregnant women aged <25 years are at high risk for infection. Local or regional prevalence surveys of chlamydial infection can be conducted to confirm the utility of using these recommendations in particular settings.

C. trachomatis infection of neonates results from perinatal exposure to the mother's infected cervix. Neonatal ocular prophylaxis with silver nitrate solution or antibiotic ointments does not prevent perinatal transmission of C. trachomatis from mother to infant. However, ocular prophylaxis with those agents does prevent gonococcal ophthalmia and, therefore, should be continued (see Ophthalmia Neonatorum Caused by C. trachomatis, below).

Initial C. trachomatis perinatal infection involves the mucous membranes of the eye, oropharynx, urogenital tract, and rectum and might be asymptomatic in these locations. C. trachomatis infection in neonates is most frequently recognized by conjunctivitis that develops 5 to 12 days after birth. C. trachomatis also can cause a subacute, afebrile pneumonia with onset at ages 1 to 3 months. C. trachomatis has been the most frequent identifiable infectious cause of ophthalmia neonatorum, but perinatal chlamydial infections, including ophthalmia and pneumonia, are detected less frequently because of the institution of widespread prenatal screening and treatment of pregnant women.

Ophthalmia Neonatorum Caused by C. trachomatis

A chlamydial etiology should be considered for all infants aged ≤30 days who have conjunctivitis, especially if the mother has a history of untreated chlamydia infection.

Diagnostic Considerations

Sensitive and specific methods used to diagnose chlamydial ophthalmia in the neonate include both tissue culture and nonculture tests (e.g., direct fluorescent antibody tests [DFA], EIA, and NAAT). The majority of nonculture tests are not FDA-cleared for the detection of chlamydia from conjunctival swabs, and clinical laboratories must verify the procedure according to CLIA regulations. Specimens must contain conjunctival cells, not exudate alone. Specimens for culture isolation and nonculture tests should be obtained from the everted eyelid using a dacron-tipped swab or the swab specified by the manufacturer's test kit. A specific diagnosis of C. trachomatis infection confirms the need for treatment not only for the neonate but also for the mother and her sex partner(s). Ocular exudate from infants being evaluated for chlamydial conjunctivitis also should be tested for N. gonorrhoeae.

Treatment

Recommended Regimen

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into 4 doses daily for 14 days (Note: An association between oral erythromycin and infantile hypertrophic pyloric stenosis has been reported in infants aged <6 weeks who were treated with this drug. Infants treated with erythromycin should be followed for signs and symptoms of idiopathic hypertrophic pyloric stenosis (IHPS). Data on use of other macrolides (e.g., azithromycin and clarithromycin) for the treatment of neonatal chlamydia infection are limited. The results of one study involving a limited number of patients suggest that a short course of azithromycin, 20 mg/kg/day orally, 1 dose daily for 3 days, may be effective.)

Topical antibiotic therapy alone is inadequate for treatment of chlamydial infection and is unnecessary when systemic treatment is administered.

Follow-Up

The efficacy of erythromycin treatment is approximately 80%; a second course of therapy might be required and, therefore, follow-up of infants is recommended to determine whether initial treatment was effective. The possibility of concomitant chlamydial pneumonia should be considered.

Management of Mothers and Their Sex Partners

The mothers of infants who have chlamydial infection and the sex partners of these women should be evaluated and treated (see the section on Chlamydial Infection in Adolescents and Adults, above).

Infant Pneumonia Caused by C. trachomatis

Characteristic signs of chlamydial pneumonia in infants include 1) a repetitive staccato cough with tachypnea and 2) hyperinflation and bilateral diffuse infiltrates on a chest radiograph. Wheezing is rare, and infants are typically afebrile. Peripheral eosinophilia ($\geq$400 cells/mm^3) occurs frequently. Because clinical presentations differ, initial treatment and diagnostic tests should include C. trachomatis for all infants aged 1-3 months who possibly have pneumonia (especially with untreated maternal chlamydial infection).

Diagnostic Considerations

Specimens for chlamydial testing should be collected from the nasopharynx. Tissue culture is the definitive standard for chlamydial pneumonia. Nonculture tests (e.g., EIA, DFA, and NAAT) can be used, although nonculture tests of nasopharyngeal specimens have a lower sensitivity and specificity than nonculture tests of ocular specimens. DFA is the only FDA-cleared test for the detection of C. trachomatis from nasopharyngeal specimens. Tracheal aspirates and lung biopsy specimens, if collected, should be tested for C. trachomatis.

Because of the delay in obtaining test results for chlamydia, the decision to provide treatment for C. trachomatis pneumonia must frequently be based on

clinical and radiologic findings. The results of tests for chlamydial infection assist in the management of an infant's illness and determine the need for treating the mother and her sex partner(s).

Recommended Regimen

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into 4 doses daily for 14 days

Follow-Up

The effectiveness of erythromycin in treating pneumonia caused by C. trachomatis is approximately 80%; a second course of therapy might be required. Follow-up of infants is recommended to determine whether the pneumonia has resolved. Some infants with chlamydial pneumonia have abnormal pulmonary function tests later in childhood.

Management of Mothers and Their Sex Partners

Mothers of infants who have chlamydia pneumonia and the sex partners of these women should be evaluated and treated according to the recommended treatment of adults for chlamydial infections (see Chlamydial Infection in Adolescents and Adults, above).

Infants Born to Mothers Who Have Chlamydial Infection

Infants born to mothers who have untreated chlamydia are at high risk for infection; however, prophylactic antibiotic treatment is not indicated, and the efficacy of such treatment is unknown. Infants should be monitored to ensure appropriate treatment if symptoms develop.

Chlamydial Infections Among Children

Sexual abuse must be considered a cause of chlamydial infection in preadolescent children, although perinatally transmitted C. trachomatis infection of the nasopharynx, urogenital tract, and rectum might persist for >1 year (see the NGC summary of the CDC guideline Sexual Assault and STDS, section titled Sexual Assault or Abuse of Children).

Diagnostic Considerations

Nonculture, nonamplified probe tests for chlamydia (EIA, DFA) should not be used because of the possibility of false-positive test results. With respiratory tract specimens, false-positive results can occur because of cross-reaction of test reagents with C. pneumoniae; with genital and anal specimens, false-positive results might occur because of cross-reaction with fecal flora.

Treatment

Recommended Regimens for Children Who Weigh <45 kg

- Erythromycin base or ethylsuccinate 50 mg/kg/day orally divided into 4 doses daily for 14 days

Recommended Regimen for Children Who Weigh >45 kg but Who Are Aged >8 Years

- Azithromycin 1 g orally in a single dose

Recommended Regimens for Children Aged >8 Years

- Azithromycin 1 g orally in a single dose

  OR

- Doxycycline 100 mg orally twice a day for 7 days

Other Management Considerations

See the NGC summary of the CDC guideline Sexual Assault and STDS, section Sexual Assault or Abuse of Children.

Follow-Up

Follow-up cultures are necessary to ensure that treatment has been effective.

Gonococcal Infections*

Note from NGC and CDC: In April 2007, CDC released an update to recommendations regarding the treatment of gonococcal infections. Based on data from the Gonococcal Isolate Surveillance Project (GISP), which monitors antimicrobial susceptibilities of Neisseria gonorrhoeae, CDC no longer recommends the use of fluoroquinolones for the treatment of gonococcal infections and associated conditions such as pelvic inflammatory disease. The new gonococcal infection treatment recommendations are included below under the heading "April 2007 Addendum." Where that information supersedes the 2006 guideline, this has been noted. All other recommendations remain unchanged.

Gonococcal Infections in Adolescents and Adults

In the United States, an estimated 600,000 new N. gonorrhoeae infections occur each year. Gonorrhea is the second most commonly reported bacterial STD. The majority of urethral infections caused by N. gonorrhoeae among men produce symptoms that cause them to seek curative treatment soon enough to prevent serious sequelae, but treatment might not be soon enough to prevent transmission to others. Among women, several infections do not produce recognizable symptoms until complications (e.g., PID) have occurred. Both symptomatic and asymptomatic cases of PID can result in tubal scarring that can lead to infertility or ectopic pregnancy.

Because gonococcal infections among women frequently are asymptomatic, an essential component of gonorrhea control in the United States continues to be the

screening of women at high risk for STDs. The U.S. Preventive Services Task Force (USPSTF) recommends that clinicians screen all sexually active women, including those who are pregnant, for gonorrhea infection if they are at increased risk. Women aged <25 years are at highest risk for gonorrhea infection. Other risk factors for gonorrhea include a previous gonorrhea infection, other sexually transmitted infections, new or multiple sex partners, inconsistent condom use, commercial sex work, and drug use. The prevalence of gonorrhea infection varies widely among communities and patient populations. The USPSTF does not recommend screening for gonorrhea in men and women who are at low risk for infection.

Diagnostic Considerations

Because of high specificity (>99%) and sensitivity (>95%), a Gram stain of a male urethral specimen that demonstrates polymorphonuclear leukocytes with GNID can be considered diagnostic for infection with N. gonorrhoeae in symptomatic men. However, because of lower sensitivity, a negative Gram stain should not be considered sufficient for ruling out infection in asymptomatic men. In addition, Gram stain of endocervical specimens, pharyngeal, or rectal specimens also are not sufficient to detect infection and, therefore, are not recommended. Specific testing for N. gonorrhoeae is recommended because of the increased utility and availability of highly sensitive and specific testing methods and because a specific diagnosis might enhance partner notification.

Specific diagnosis of infection with N. gonorrhoeae may be performed by testing endocervical, vaginal, male urethral, or urine specimens. Culture, nucleic acid hybridization tests, and NAAT are available for the detection of genitourinary infection with N. gonorrhoeae. Culture and nucleic acid hybridization tests require female endocervical or male urethral swab specimens. NAAT offer the widest range of testing specimen types because they are FDA-cleared for use with endocervical swabs, vaginal swabs, male urethral swabs, and female and male urine. However, product inserts for each NAAT vendor must be carefully examined to assess current indications because FDA-cleared specimen types might vary. In general, culture is the most widely available option for the diagnosis of infection with N. gonorrhoeae in nongenital sites (e.g., rectum and pharynx). Nonculture tests are not FDA-cleared for use in the rectum and pharynx. Some NAATs have the potential to cross-react with nongonococcal Neisseria and related organisms that are commonly found in the throat. Some noncommercial laboratories have initiated NAAT of rectal and pharyngeal swab specimens after establishing the performance of the test to meet CLIA requirements.

Because nonculture tests cannot provide antimicrobial susceptibility results, in cases of persistent gonococcal infection after treatment, clinicians should perform both culture and antimicrobial susceptibility testing.

All patients tested for gonorrhea should be tested for other STDs, including chlamydia, syphilis, and HIV.

Treatment

Dual Therapy for Gonococcal and Chlamydial Infections

April 2007 Addendum

Persons in whom gonococcal infection is diagnosed should be treated for possible coinfection with Chlamydia trachomatis with a single dose of azithromycin 1 g by mouth or with doxycycline 100 mg twice a day, by mouth for 7 days, if chlamydial infection has not been ruled out.

2006 Guideline

Patients infected with N. gonorrhoeae frequently are coinfected with C. trachomatis; this finding has led to the recommendation that patients treated for gonococcal infection also be treated routinely with a regimen that is effective against uncomplicated genital C. trachomatis infection. Because the majority of gonococci in the United States are susceptible to doxycycline and azithromycin, routine cotreatment might also hinder the development of antimicrobial-resistant N. gonorrhoeae.

Because of the high sensitivity of NAATs for chlamydial infection, patients with a negative chlamydial NAAT result at the time of treatment for gonorrhea do not need to be treated for chlamydia as well. However, if chlamydial test results are not available or if a non-NAAT was negative for chlamydia, patients should be treated for both gonorrhea and chlamydia.

Quinolone-Resistant N. gonorrhoeae (QRNG)

April 2007 Addendum

During January–June 2006, fluoroquinolone-resistant Neisseria gonorrhoeae (QRNG) was identified in 25 out of 26 Gonococcal Isolate Surveillance Project (GISP) sites, and increases in the prevalence of QRNG were observed among isolates from heterosexual males and men who have sex with men (MSM) in most regions of the country. As a result, CDC no longer recommends fluoroquinolones for treatment of gonorrhea in the United States; similarly, CDC no longer recommends fluoroquinolones for treatment of other conditions that might be caused by N. gonorrhoeae, such as pelvic inflammatory disease (PID).

CDC has recommended single-dose fluoroquinolone regimens for the treatment of gonococcal infections since 1993. Although QRNG was identified as a problem in Asia in 1991 and was first identified in Hawaii in the same year, only sporadic occurrences were noted in the continental United States during the 1990s. However, since 1999, increasing resistance of N. gonorrhoeae to the fluoroquinolones has been observed, first in Hawaii, then in California and other Western states, then among MSM, and now in other populations and regions. CDC has changed treatment recommendations when QRNG prevalence has reached >5% in defined groups and locations, with consideration given to other factors such as the prevalence of gonorrhea, the availability of antimicrobial susceptibility data, and the costs of diagnostic and treatment options. This >5% threshold has been used by CDC and the World Health Organization so that all recommended treatments for gonorrhea can be expected to cure ≥95% of infections.

2006 Guideline*

*Note: This section from the 2006 guideline has been updated by the April 2007 Addendum. See above and the "Availability of Companion Documents" field at the end of the summary for more information.

Uncomplicated Gonococcal Infections of the Cervix, Urethra, and Rectum

Recommended Regimens

April 2007 Addendum

Because fluoroquinolones are no longer recommended, the options for treating gonococcal infections in the United States are limited (see Box below). For the treatment of uncomplicated urogenital and anorectal gonorrhea, CDC now recommends a single intramuscular dose of ceftriaxone 125 mg or a single oral dose of cefixime 400 mg. However, 400-mg tablets of cefixime are not available; cefixime is only available in a suspension formulation. Some evidence suggests that a single oral dose of cefpodoxime 400 mg or cefuroxime axetil 1 g might be additional oral alternatives for the treatment of urogenital and anorectal gonorrhea.

Box. Updated Recommended Treatment Regiments for Gonococcal Infections and Associated Conditions—United States, April 2007

Uncomplicated Gonococcal Infections of the Cervix, Urethra, and Rectum*

Recommended Regimens

- Ceftriaxone 125 mg in a single intramuscular (IM) dose

  OR

- Cefixime** 400 mg in a single oral dose

  PLUS

- TREATMENT FOR CHLAMYDIA IF CHLAMYDIAL INFECTION IS NOT RULED OUT

Alternative Regimens

- Spectinomycin** 2 g in a single IM dose

  OR

- Cephalosporin single-dose regimens***

Uncomplicated Gonococcal Infections of the Pharynx*

Recommended Regimens

- Ceftriaxone 125 mg in a single IM dose

  PLUS

- TREATMENT FOR CHLAMYDIA IF CHLAMYDIAL INFECTION IS NOT RULED OUT

Disseminated Gonococcal Infection

See "Updated recommended treatment regimens for gonococcal infections and associated conditions" in the "Availability of Companion Documents" field for recommended and alternative regimens.

Pelvic Inflammatory Disease

See "Updated recommended treatment regimens for gonococcal infections and associated conditions" in the "Availability of Companion Documents" field for recommended and alternative parenteral and oral regimens

Epididymitis

See "Updated recommended treatment regimens for gonococcal infections and associated conditions" in the "Availability of Companion Documents" field for recommended and alternative regimens.

*For all adult and adolescent patients, regardless of travel history or sexual behavior. Information regarding management of these infections in patients with documented severe allergic reactions to penicillins or cephalosporins is available in "Updated recommended treatment regimens for gonococcal infections and associated conditions" (see the "Availability of Companion Documents" field).

**Not available in the United States.

*** Other single-dose cephalosporin regimens that are considered alternative treatment regimens against uncomplicated urogenital and anorectal gonococcal infections include ceftizoxime 500 mg IM; or cefoxitin 2 g IM, administered with probenecid 1 g orally; or cefotaxime 500 mg IM. Some evidence indicates that cefpodoxime 400 mg and cefuroxime axetil 1 g might be oral alternatives.

2006 Guideline*

*Note: Information from the 2006 guideline regarding recommended treatment regimens has been updated by the April 2007 Addendum. See the box labeled " Updated Recommended Treatment Regimens for Gonococcal Infections and Associated Conditions—United States, April 2007," above.

To maximize compliance with recommended therapies, medications for gonococcal infections should be dispensed on site.

Ceftriaxone in a single injection of 125 mg provides sustained, high bactericidal levels in the blood. Extensive clinical experience indicates that ceftriaxone is safe and effective for the treatment of uncomplicated gonorrhea at all anatomic sites, curing 98.9% of uncomplicated urogenital and anorectal infections in published clinical trials.

Cefixime has an antimicrobial spectrum similar to that of ceftriaxone, but the 400 mg oral dose does not provide as high, nor as sustained, a bactericidal level as that provided by the 125 mg dose of ceftriaxone. In published clinical trials, the 400 mg dose cured 97.4% of uncomplicated urogenital and anorectal gonococcal infections. The advantage of cefixime is that it can be administered orally. Updates on the availability of cefixime are available from CDC or state health departments.

Note: Information from the 2006 guideline regarding the use of fluoroquinolones has been updated. Effective April 2007, the CDC no longer recommends the use of fluoroquinolones (e.g., ciprofloxacin, ofloxacin, or levofloxacin) for the treatment of gonococcal infections and associated conditions such as pelvic inflammatory disease. See the updated recommendations for treatment above.

Alternative Regimens

April 2007 Addendum

Alternative parenteral single-dose regimens for urogenital and anorectal gonorrhea include ceftizoxime 500 mg, cefoxitin 2 g with probenecid 1 g orally, or cefotaxime 500 mg. However, these cephalosporin regimens do not offer any advantage over ceftriaxone. For persons with penicillin or cephalosporin allergies, a single intramuscular dose of spectinomycin 2 g is a recommended alternative. However spectinomycin is not available in the United States. Updated information from CDC regarding the availability of cefixime and spectinomycin will be available at http://www.cdc.gov/std/gonorrhea/arg.

2006 Guideline

Several other antimicrobials are active against N. gonorrhoeae, but none have substantial advantages over the recommended regimens. Spectinomycin is expensive and must be injected; however, it has been effective in published clinical trials, curing 98.2% of uncomplicated urogenital and anorectal gonococcal infections. Spectinomycin is useful for the treatment of patients who cannot tolerate cephalosporins and quinolones.

Single-dose cephalosporin regimens (other than ceftriaxone 125 mg IM and cefixime 400 mg orally) that are safe and highly effective against uncomplicated urogenital and anorectal gonococcal infections include ceftizoxime (500 mg, administered IM), cefoxitin (2 g, administered IM with probenecid 1 g orally), and cefotaxime (500 mg, administered IM). None of the injectable cephalosporins offer any advantage over ceftriaxone.

Note: Information from the 2006 guideline regarding the use of fluoroquinolones has been updated. Effective April 2007, the CDC no longer recommends the use of fluoroquinolones (e.g., ciprofloxacin, ofloxacin, or levofloxacin) for the treatment of gonococcal infections and associated conditions such as pelvic inflammatory disease. See the updated recommendations for treatment above.

Some evidence suggests that cefpodoxime and cefuroxime axetil 1 g orally might be additional oral alternatives in the treatment of uncomplicated urogenital

gonorrhea; additional information on alternative oral regimens are available at http://www.cdc.gov/std. Cefpodoxime proxetil 200 mg orally is less active against N. gonorrhoeae than cefixime and also does not quite meet the minimum efficacy criteria (demonstrated efficacy with lower 95% confidence interval [CI] of ≥95% in summed clinical trials) with cure rates, 96.5% (CI = 94.8%-98.9%) for urogenital and rectal infection; efficacy in treating pharyngeal infection is unsatisfactory, 78.9% (CI = 54.5%-94%). Clinical studies are being conducted to assess whether cefpodoxime 400 mg orally is an acceptable oral alternative. Treatment with cefuroxime axetil 1 g PO does not quite meet the minimum efficacy criteria for urogenital and rectal infection (95.9%; CI = 94.5%-97.3%) and, its efficacy in treating pharyngeal infection is unacceptable (56.9%; CI = 42.2%-70.7%).

April 2007 Addendum

A single oral dose of azithromycin 2 g is effective against uncomplicated gonococcal infections, but CDC does not recommend widespread use of azithromycin because of concerns regarding rapid emergence of resistance, as evidenced by the increase in azithromycin minimum inhibitory concentrations (MICs) documented since 1999 in the United States and internationally. However, azithromycin might be an option for treatment of uncomplicated gonococcal infections from any site (i.e., urogenital, anorectal, and pharyngeal) in persons with documented severe allergic reactions to penicillins or cephalosporins.

2006 Guideline

Azithromycin 2 g orally is effective against uncomplicated gonococcal infection but is expensive and causes gastrointestinal distress and is not recommended for treatment of gonorrhea. Although azithromycin 1 g theoretically meets alternative regimen criteria, it is not recommended because of concerns regarding the possible rapid emergence of antimicrobial resistance. N. gonorrhoeae in the United States is not adequately susceptible to penicillins, tetracyclines, and macrolides (e.g., erythromycin) for these antimicrobials to be recommended.

Uncomplicated Gonococcal Infections of the Pharynx

Recommended Regimens

April 2007 Addendum

For pharyngeal gonorrhea, CDC now recommends a single intramuscular dose of ceftriaxone 125 mg (see Box above); pharyngeal gonococcal infections often are asymptomatic and more difficult to eradicate than urogenital and anorectal infections. Spectinomycin, cefixime, cefpodoxime, and cefuroxime axetil do not appear adequate for treating pharyngeal gonococcal infections.

2006 Guideline*

Note: Information from the 2006 guideline regarding recommended treatment regimens has been updated by the April 2007 Addendum. See the box labeled "

Updated Recommended Treatment Regimens for Gonococcal Infections and Associated Conditions—United States, April 2007," above.

Gonococcal infections of the pharynx are more difficult to eradicate than infections at urogenital and anorectal sites. Few antimicrobial regimens can reliably cure >90% of gonococcal pharyngeal infections. Although chlamydial coinfection of the pharynx is unusual, coinfection at genital sites sometimes occurs. Therefore, treatment for both gonorrhea and chlamydia is recommended.

Follow-Up

April 2007 Addendum

Test of cure is not recommended routinely for patients with uncomplicated gonorrhea who have been treated with recommended or alternative regimens. Persons with persistent symptoms of gonococcal infection or whose symptoms recur shortly after treatment with a recommended or alternative regimen should be reevaluated by culture for N. gonorrhoeae; positive isolates should undergo antimicrobial-susceptibility testing. Clinicians and laboratories should report treatment failures or resistant gonococcal isolates to CDC at 404-639-8373 through state and local public health authorities.

With fluoroquinolones no longer recommended for the treatment of gonococcal infections, only one class of drug, cephalosporins, is still recommended and available. Therefore, state and local health departments must remain vigilant for the emergence of cephalosporin resistance.

With use of nonculture tests to diagnose N. gonorrhoeae increasing and with local data on antimicrobial susceptibility less available, CDC strongly recommends that all state and local health department laboratories maintain or develop the capacity to perform culture. CDC also encourages all state and local health department laboratories to maintain the capacity to perform antimicrobial-susceptibility testing or form partnerships with experienced laboratories that can perform such testing. At a minimum, antimicrobial-susceptibility testing should be performed for ceftriaxone, spectinomycin, azithromycin, and any other regimens that are used locally for gonorrhea treatment.

2006 Guideline

Patients who have uncomplicated gonorrhea and who are treated with any of the recommended or alternative regimens do not need a test of cure. Patients who have symptoms that persist after treatment should be evaluated by culture for N. gonorrhoeae, and any gonococci isolated should be tested for antimicrobial susceptibility. Persistent urethritis, cervicitis, or proctitis also might be caused by C. trachomatis or other organisms.

A high prevalence of N. gonorrhoeae infection is observed in patients who have had gonorrhea in the preceding several months. The majority of infections identified after treatment with one of the recommended regimens result from reinfection rather than treatment failure, indicating a need for improved patient education and referral of sex partners. Repeat infection might confer an elevated

risk for PID and other complications, when compared with initial infection. Clinicians should consider advising all patients with gonorrhea to be retested 3 months after treatment. If patients do not seek medical care for retesting in 3 months, providers are encouraged to test these patients whenever they next seek medical care within the following 12 months, regardless of whether the patient believes that their sex partners were treated. Retesting is distinct from test of cure to detect therapeutic failure, which is not recommended.

Management of Sex Partners

Effective clinical management of patients with treatable STDs requires treatment of the patients' recent sex partners to prevent reinfection and curtail further transmission. Patients should be instructed to refer their sex partners for evaluation and treatment. Sex partners of patients with N. gonorrhoeae infection whose last sexual contact with the patient was within 60 days before onset of symptoms or diagnosis of infection in the patient should be evaluated and treated for N. gonorrhoeae and C. trachomatis infections. If a patient's last sexual intercourse was >60 days before onset of symptoms or diagnosis, the patient's most recent sex partner should be treated. Patients should be instructed to avoid sexual intercourse until therapy is completed and until they and their sex partners no longer have symptoms.

For patients with gonorrhea whose partners' treatment cannot be ensured or is unlikely, delivery of antibiotic therapy (i.e., either a prescription or medication) by heterosexual male or female patients to their partners is an option (see the NGC summary of the CDC guideline Clinical Prevention Guidance under the section Partner Management). Use of this approach should always be accompanied by efforts to educate partners about symptoms and to encourage partners to seek clinical evaluation. Male patients must inform female partners of their infection and be given accompanying materials about the importance of seeking medical evaluation for PID (especially if symptomatic). Possible undertreatment of PID in female partners and possible missed opportunities to diagnose other STDs are of concern and have not been evaluated in comparisons with patient-delivered therapy and partner referral. Patient-delivered therapy for patients with gonorrhea should routinely include treatment for chlamydia. This approach should not be considered a routine partner management strategy in MSM because of the high risk of coexisting undiagnosed STDs or HIV infection.

Special Considerations

Allergy, Intolerance, and Adverse Reactions

Persons who cannot tolerate cephalosporins or quinolones* should be treated with spectinomycin. Because spectinomycin is unreliable (52% effective) against pharyngeal infections, patients who have suspected or known pharyngeal infection should have a pharyngeal culture 3-5 days after treatment to verify eradication of infection.

Pregnancy

Pregnant women should not be treated with quinolones* or tetracyclines. Those infected with N. gonorrhoeae should be treated with a recommended or alternate

cephalosporin. Women who cannot tolerate a cephalosporin should be administered a single 2-g dose of spectinomycin IM. Either azithromycin or amoxicillin is recommended for treatment of presumptive or diagnosed C. trachomatis infection during pregnancy (see Chlamydial Infections above).

Administration of Quinolones* to Adolescents

Fluoroquinolones* have not been recommended for persons aged <18 years because studies have indicated that they can damage articular cartilage in some young animals. However, no joint damage attributable to quinolone* therapy has been observed in children treated with prolonged ciprofloxacin regimens. Therefore, children who weigh >45 kg can be treated with any regimen recommended for adults (see Gonococcal Infections above).

*Note: Effective April 2007, the CDC no longer recommends the use of fluoroquinolones (e.g., ciprofloxacin, ofloxacin, or levofloxacin) for the treatment of gonococcal infections and associated conditions such as pelvic inflammatory disease. See the updated recommendations for treatment above.

HIV Infection

Patients who have gonococcal infection and also are infected with HIV should receive the same treatment regimen as those who are HIV negative.

Gonococcal Conjunctivitis

In the only published study of the treatment of gonococcal conjunctivitis among U.S. adults, all 12 study participants responded to a single 1-g IM injection of ceftriaxone. The following recommendation reflects the opinions of consultants knowledgeable in the field of STDs.

Recommended Regimen

- Ceftriaxone 1 g IM in a single dose

Consider lavage of the infected eye with saline solution once.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infections, Management of Sex Partners, above).

Disseminated Gonococcal Infection (DGI)

DGI results from gonococcal bacteremia. DGI frequently results in petechial or pustular acral skin lesions, asymmetrical arthralgia, tenosynovitis, or septic arthritis. The infection is complicated occasionally by perihepatitis and rarely by endocarditis or meningitis. Some strains of N. gonorrhoeae that cause DGI may cause minimal genital inflammation.

No studies on the treatment of DGI among adults have been published since publication of the last CDC STD treatment guidelines publication. DGI treatment recommendations reflect the opinions of consultants. No treatment failures have been reported with the recommended regimens.

Treatment

April 2007 Addendum

See "Updated recommended treatment regimens for gonococcal infections and associated conditions" in the "Availability of Companion Documents" field for recommended and alternative regimens.

2006 Guideline

Hospitalization is recommended for initial therapy, especially for patients who might not comply with treatment, for those in whom diagnosis is uncertain, and for those who have purulent synovial effusions or other complications. Patients should be examined for clinical evidence of endocarditis and meningitis. Patients treated for DGI should be treated presumptively for concurrent C. trachomatis infection, unless appropriate testing excludes this infection.

Recommended Regimen*

*Note: Information from the 2006 guideline regarding recommended and alternative treatment regimens has been updated by the April 2007 Addendum. See "Updated recommended treatment regimens for gonococcal infections and associated conditions" in the "Availability of Companion Documents" field for recommended and alternative regimens.

Management of Sex Partners

Gonococcal infection frequently is asymptomatic in sex partners of patients who have DGI. As with uncomplicated gonococcal infections, patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners, above).

Gonococcal Meningitis and Endocarditis

Treatment

Recommended Regimen

- Ceftriaxone 1-2 g IV every 12 hours

Therapy for meningitis should be continued for 10-14 days; therapy for endocarditis should be continued for at least 4 weeks. Treatment of complicated DGI should be undertaken in consultation with a specialist.

Management of Sex Partners

Patients should be instructed to refer their sex partners for evaluation and treatment (see Gonococcal Infection, Management of Sex Partners, above).

Gonococcal Infections Among Infants

Gonococcal infection among infants usually results from exposure to infected cervical exudate at birth. It is usually an acute illness that manifests 2 to 5 days after birth. The prevalence of infection among infants depends on the prevalence of infection among pregnant women, whether pregnant women are screened for gonorrhea, and whether newborns receive ophthalmia prophylaxis. The most severe manifestations of N. gonorrhoeae infection in newborns are ophthalmia neonatorum and sepsis, which can include arthritis and meningitis. Less severe manifestations include rhinitis, vaginitis, urethritis, and reinfection at sites of fetal monitoring.

Ophthalmia Neonatorum Caused by N. gonorrhoeae

In the United States, although N. gonorrhoeae causes ophthalmia neonatorum less frequently than C. trachomatis and nonsexually transmitted agents, identifying and treating this infection is especially important because ophthalmia neonatorum can result in perforation of the globe of the eye and blindness.

Diagnostic Considerations

Infants at increased risk for gonococcal ophthalmia are those who do not receive ophthalmia prophylaxis and those whose mothers have had no prenatal care or whose mothers have a history of STDs or substance abuse. Gonococcal ophthalmia is strongly suspected when intracellular GNID are identified in conjunctival exudate, justifying presumptive treatment for gonorrhea after appropriate cultures for N. gonorrhoeae are obtained. Appropriate chlamydial testing should be done simultaneously. Presumptive treatment for N. gonorrhoeae might be indicated for newborns who are at increased risk for gonococcal ophthalmia and who have conjunctivitis but do not have gonococci in a Gram-stained smear of conjunctival exudate.

In all cases of neonatal conjunctivitis, conjunctival exudates should be cultured for N. gonorrhoeae and tested for antibiotic susceptibility before a definitive diagnosis is made. A definitive diagnosis is vital because of the public health and social consequences of a diagnosis of gonorrhea. Nongonococcal causes of neonatal ophthalmia include Moraxella catarrhalis and other Neisseria species that are indistinguishable from N. gonorrhoeae on Gram-stained smear but can be differentiated in the microbiology laboratory.

Treatment

Recommended Regimen

- Ceftriaxone 25 to 50 mg/kg IV or IM in a single dose, not to exceed 125 mg

Topical antibiotic therapy alone is inadequate and is unnecessary if systemic treatment is administered.

Other Management Considerations

Simultaneous infection with C. trachomatis should be considered when a patient does not improve after treatment. Both mother and infant should be tested for chlamydial infection at the same time that gonorrhea testing is conducted (see Ophthalmia Neonatorum Caused by C. trachomatis, above). Ceftriaxone should be administered cautiously to hyperbilirubinemic infants, especially those born prematurely.

Follow-Up

Infants who have gonococcal ophthalmia should be hospitalized and evaluated for signs of disseminated infection (e.g., sepsis, arthritis, and meningitis). One dose of ceftriaxone is adequate therapy for gonococcal conjunctivitis.

Management of Mothers and Their Sex Partners

The mothers of infants who have gonococcal infection and the mothers' sex partners should be evaluated and treated according to the recommendations for treating gonococcal infections in adults (see Gonococcal Infections in Adolescents and Adults, above).

DGI and Gonococcal Scalp Abscesses in Newborns

Sepsis, arthritis, and meningitis (or any combination of these conditions) are rare complications of neonatal gonococcal infection. Localized gonococcal infection of the scalp can result from fetal monitoring through scalp electrodes. Detection of gonococcal infection in neonates who have sepsis, arthritis, meningitis, or scalp abscesses requires cultures of blood, CSF, and joint aspirate on chocolate agar. Specimens obtained from the conjunctiva, vagina, oropharynx, and rectum that are cultured on gonococcal selective medium are useful for identifying the primary site(s) of infection, especially if inflammation is present. Positive Gram-stained smears of exudate, CSF, or joint aspirate provide a presumptive basis for initiating treatment for N. gonorrhoeae. Diagnoses based on Gram-stained smears or presumptive identification of cultures should be confirmed with definitive tests on culture isolates.

Treatment

Recommended Regimens

- Ceftriaxone 25 to 50 mg/kg/day IV or IM in a single daily dose for 7 days, with a duration of 10--14 days, if meningitis is documented

  OR

- Cefotaxime 25 mg/kg IV or IM every 12 hours for 7 days, with a duration of 10 to 14 days, if meningitis is documented

Prophylactic Treatment for Infants Whose Mothers Have Gonococcal Infection

Infants born to mothers who have untreated gonorrhea are at high risk for infection.

Recommended Regimen in the Absence of Signs of Gonococcal Infection

- Ceftriaxone 25 to 50 mg/kg IV or IM, not to exceed 125 mg, in a single dose

Other Management Considerations

Both mother and infant should be tested for chlamydial infection.

Follow-Up

Follow-up examination is not required.

Management of Mothers and Their Sex Partners

The mothers of infants who have gonococcal infection and the mothers' sex partners should be evaluated and treated according to the recommendations for treatment of gonococcal infections in adults (see Gonococcal Infections above).

Gonococcal Infections Among Children

Sexual abuse is the most frequent cause of gonococcal infection in pre-adolescent children (See the NGC summary of the CDC guideline Sexual Assault and STDS, section Sexual Assault or Abuse of Children). Vaginitis is the most common manifestation of gonococcal infection in preadolescent girls. PID after vaginal infection is probably less common in children than among adults. Among sexually abused children, anorectal and pharyngeal infections with N. gonorrhoeae are common and frequently asymptomatic.

Diagnostic Considerations

Because of the legal implications of a diagnosis of N. gonorrhoeae infection in a child, only standard culture procedures for the isolation of N. gonorrhoeae should be used for children. Nonculture gonococcal tests for gonococci (e.g., Gram-stained smear, nucleic acid hybridization tests, EIA, and NAAT) should not be used without standard culture; none of these tests have been approved by FDA for use with specimens obtained from the oropharynx, rectum, or genital tract of children. Specimens from the vagina, urethra, pharynx, or rectum should be streaked onto selective media for isolation of N. gonorrhoeae, and all presumptive isolates of N. gonorrhoeae should be identified definitively by at least two tests that involve different principles (e.g., biochemical, enzyme substrate, or serologic). Isolates should be preserved to enable additional or repeated testing.

Recommended Regimens for Children Who Weigh >45 kg

- Treat with one of the regimens recommended for adults (see Gonococcal Infections, above)

Fluoroquinolones* have not been recommended for persons aged <18 years because they have damaged articular cartilage in young animals. However, no such joint damage clearly attributable to quinolone therapy has been observed in children, even in those receiving multiple-dose regimens.

*Note: Effective April 2007, the CDC no longer recommends the use of fluoroquinolones (e.g., ciprofloxacin, ofloxacin, or levofloxacin) for the treatment of gonococcal infections and associated conditions such as pelvic inflammatory disease. See the updated recommendations for treatment above.

Recommended Regimens for Children Who Weigh <45 kg and Who Have Uncomplicated Gonococcal Vulvovaginitis, Cervicitis, Urethritis, Pharyngitis, or Proctitis

- Ceftriaxone 125 mg IM in a single dose

Alternative Regimen

- Spectinomycin 40 mg/kg (maximum dose: 2 g) IM in a single dose may be used, but this therapy is unreliable for treatment of pharyngeal infections. Some specialists use cefixime to treat gonococcal infections in children because it can be administered orally; however, no reports have been published concerning the safety or effectiveness of cefixime used for this purpose.

Recommended Regimen for Children Who Weigh <45 kg and Who Have Bacteremia or Arthritis

- Ceftriaxone 50 mg/kg (maximum dose: 1 g) IM or IV in a single dose daily for 7 days

Recommended Regimen for Children Who Weigh >45 kg and Who Have Bacteremia or Arthritis

- Ceftriaxone 50 mg/kg IM or IV in a single dose daily for 7 days

Follow-Up

Follow-up cultures are unnecessary if ceftriaxone is used. If spectinomycin is used to treat pharyngitis, a follow-up culture is necessary to ensure that treatment was effective.

Other Management Considerations

Only parenteral cephalosporins are recommended for use in children. Ceftriaxone is approved for all gonococcal infections in children; cefotaxime is approved for gonococcal ophthalmia only. Oral cephalosporins used for treatment of gonococcal infections in children have not been adequately evaluated.

All children who have gonococcal infections should be evaluated for coinfection with syphilis and C. trachomatis. (For a discussion of concerns regarding sexual

assault, refer to the NGC summary of the CDC guideline Sexual Assault and STDs, specifically the section on Sexual Assault or Abuse of Children).

Ophthalmia Neonatorum Prophylaxis

To prevent gonococcal ophthalmia neonatorum, a prophylactic agent should be instilled into the eyes of all newborn infants; this procedure is required by law in the majority of states. All of the recommended prophylactic regimens in this section prevent gonococcal ophthalmia. However, the efficacy of these preparations in preventing chlamydial ophthalmia is less clear, and they do not eliminate nasopharyngeal colonization by C. trachomatis. The diagnosis and treatment of gonococcal and chlamydial infections in pregnant women is the best method for preventing neonatal gonococcal and chlamydial disease. Not all women, however, receive prenatal care. Ocular prophylaxis is warranted because it can prevent sight-threatening gonococcal ophthalmia and because it is safe, easy to administer, and inexpensive.

Prophylaxis

Recommended Regimens

- Erythromycin (0.5%) ophthalmic ointment in a single application

  OR

- Tetracycline ophthalmic ointment (1%) in a single application

One of these recommended preparations should be instilled into both eyes of every neonate as soon as possible after delivery. If prophylaxis is delayed (i.e., not administered in the delivery room), a monitoring system should be established to ensure that all infants receive prophylaxis. All infants should be administered ocular prophylaxis, regardless of whether they are delivered vaginally or by cesarean section. Single-use tubes or ampules are preferable to multiple-use tubes. Bacitracin is not effective. Use of povidone iodine has not been studied adequately.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is not specifically stated for each recommendation.

Throughout the 2006 guideline document, the evidence used as the basis for specific recommendations is discussed briefly. More comprehensive, annotated

discussions of such evidence will appear in background papers that will be published in a supplement issue of the journal Clinical Infectious Diseases.

April 2007 Addendum

This report is based on data from the Gonococcal Isolate Surveillance Project (GISP), a Centers for Disease Control and Prevention (CDC) sponsored sentinel surveillance system that has been monitoring antimicrobial susceptibilities of Neisseria gonorrhoeae in the United States since 1986.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Appropriate screening and management of urethritis, nongonococcal urethritis, mucopurulent cervicitis, chlamydial infection, and gonococcal infection
- Prevention of transmission of urethritis, nongonococcal urethritis, chlamydial infection, and gonococcal infection to sex partners and infants of infected mothers

POTENTIAL HARMS

- The frequent side effects of erythromycin might discourage patient compliance with this regimen.
- An association between oral erythromycin and infantile hypertrophic pyloric stenosis (IHPS) has been reported in infants aged <6 weeks who were treated with this drug.
- The safety and efficacy of azithromycin use in pregnant and lactating women have not been established.
- Pregnant women should not be treated with quinolones or tetracyclines.
- Ceftriaxone should be administered cautiously to hyperbilirubinemic infants, especially those born prematurely.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Doxycycline, ofloxacin, and levofloxacin are contraindicated in pregnant women.
- Erythromycin estolate is contraindicated during pregnancy because of drug-related hepatotoxicity.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- These recommendations were developed in consultation with public- and private-sector professionals knowledgeable in the treatment of patients with sexually transmitted diseases (STDs). The recommendations are applicable to

various patient-care settings, including family planning clinics, private physicians' offices, managed care organizations, and other primary-care facilities.
- These recommendations are meant to serve as a source of clinical guidance: health-care providers should always consider the individual clinical circumstances of each person in the context of local disease prevalence. These guidelines focus on the treatment and counseling of individual patients and do not address other community services and interventions that are important in STD/human immunodeficiency virus (HIV) prevention.
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April 2007 Addendum

The Gonococcal Isolate Surveillance Project (GISP) is the only national, sentinel surveillance system that monitors emerging resistance in N. gonorrhoeae in the United States; with the decreasing use of culture to diagnose gonorrhea, GISP has become an increasingly important source of information on N. gonorrhoeae that are resistant to antimicrobials. Findings from GISP, which is conducted in publicly funded clinics and includes only male urethral isolates, might not be representative of the entire U.S. population infected with gonorrhea.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Centers for Disease Control and Prevention (CDC). Update to CDC's sexually transmitted diseases treatment guidelines, 2006: fluoroquinolones no longer recommended for treatment of gonococcal infections. MMWR Morb Mortal Wkly Rep 2007 Apr 13;56(14):332-6. [10 references] PubMed

Centers for Disease Control and Prevention, Workowski KA, Berman SM. Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines 2006 [published errata appear in MMWR Morb Mortal Wkly Rep 2006 Sep 15;55(36):997]. MMWR Morb Mortal Wkly Rep 2006 Aug 4;55(RR-11):35-49. [222 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1993 (revised 2006 Aug 4; addendum released 2007 Apr 13)

GUIDELINE DEVELOPER(S)

Centers for Disease Control and Prevention - Federal Government Agency [U.S.]

GUIDELINE DEVELOPER COMMENT

These guidelines for the treatment of persons who have sexually transmitted diseases (STDs) were developed by CDC after consultation with a group of professionals knowledgeable in the field of STDs who met in Atlanta, Georgia, during April 19–21, 2005.

SOURCE(S) OF FUNDING

United States Government

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Not stated

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline, combined with the addendum, updates a previous version: Centers for Disease Control and Prevention. Diseases characterized by urethritis and cervicitis. Sexually transmitted diseases treatment guidelines. MMWR Recomm Rep 2002 May 10;51(RR-6):30-42.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Centers for Disease Control and Prevention (CDC) Web site:

- HTML Format
- Portable Document Format (PDF)

April 2007 Addendum

- HTML Format
- Portable Document Format (PDF)

Print copies: Available from the Centers for Disease Control and Prevention, MMWR, Atlanta, GA 30333. Additional copies can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325; (202) 783-3238.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Workowski KA, Levine WC, Wasserheit JN. U.S. Centers for Disease Control and Prevention guidelines for the treatment of sexually transmitted diseases: an opportunity to unify clinical and public health practice. Ann Intern Med. 2002 Aug 20;137(4):255-62. Electronic copies: Available through Annals of Internal Medicine Online.
- The CDC Sexually Transmitted Diseases Treatment Guidelines 2004 for PDA or Palm OS. Available from the CDC National Prevention Information Network (NPIN) Web site.
- Updated recommended treatment regimens for gonococcal infections and associated conditions - United States, April 2007. Available from the CDC Web site.
- Dear colleague letter. 2007 Apr 12. Available from the CDC Web site.
- Antimicrobial resistance and Neisseria gonorrhoeae - CDC Fact Sheet. Available from the CDC Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on August 19, 2002. This summary was updated by ECRI on February 21, 2006 following the U.S. Food and Drug Administration (FDA) advisory on Tequin (gatifloxacin). This summary was updated by ECRI Institute on October 11, 2006 and April 27, 2007. This summary was updated by ECRI Institute on October 3, 2007 following the U.S. Food and Drug Administration (FDA) advisory on Rocephin (ceftriaxone sodium).

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